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Development of Undergraduate Gerodontology Courses in Austria, Switzerland, and Germany from 2004 to 2009

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Abstract: The growing number of individuals over the age of sixty-five with specific dental needs requires increased teaching efforts to adequately prepare predoctoral dental students. The study assessed whether such increases in undergraduate gerodontology teaching in German-speaking countries between 2004 and 2009 occurred. Questionnaires were mailed in 2004 and 2009 to all deans (n=37) and all department heads (n=140) of Austrian, Swiss, and German dental schools. Results show that gerodontology is still mostly included in traditional core subjects but that specific lecture series and practical teaching have increased. These cover a broad variety of subjects including geriatric medicine, gerontopsychiatry, nursing care, pharmacology, and public health. The number of departments with dedicated staff for gerodontology, research activities, and mean number of publications has increased. Barriers to the further integration of the subject include its continued exclusion from final examinations in Austria and Germany. Guidelines of the European College of Gerodontology (2009), which aim to prepare students to provide dental treatment to seniors by teaching theoretical knowledge, practical skills, patient management techniques, and the ethical foundation of gerodontology, need to be implemented. Continued professional education of faculty in all departments, intensified cooperation between universities, and the presence of faculty specializing in gerodontology are suggested.

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Countries of the European Union generally are characterized by diminishing populations and an increasing proportion of older persons. However, a more detailed analysis shows differences among the German-speaking countries of Austria, Switzerland, and Germany. In Germany, demographic change is due to the low birth rate and increased longevity.¹ Austria is projected to maintain a stable but aging population.² In Switzerland, the low birth rate is offset by an influx of migrants. All countries have in common that the proportion of younger and economically active people in relation to those aged sixty-five and over is decreasing.³

Future dentists in daily practice will be confronted with the demands of senior patients, who make up a very heterogeneous group. Dental students have to be prepared during their predoctoral course

to meet these demands. Didactic content should include basic geriatrics and gerontopsychiatry, diagnostic specifics, and prevention and therapy of oral diseases for seniors, as well as the development of specific communication skills and patient management techniques for older dental patients.⁴ Dental outreach training reinforces knowledge that has been gained in didactic courses.⁵ It also broadens the clinical experience and improves practical skills of students and helps them to develop an awareness of the particular treatment needs of this patient group.⁶ The combination of didactic and practical education can lead to improved patient management, treatment planning, and treatment delivery in alternative settings.⁵ It enhances students' appreciation of dentists' professional responsibilities.⁷ It has been demonstrated that undergraduate students who took part in a

gerodontology course were more likely to undertake dental care for nursing home residents.⁸ As frail and dependent nursing home residents have particularly large unmet dental treatment needs, any educational measures aimed at improving dental services for this segment of the population are of special interest. Curriculum components exposing students to mobile dentistry, like the practical training offered at Zürich University with mobiDent, are well accepted as they offer students the opportunity to actively participate in treatment delivery.⁹

The number of one's own teeth retained into old age has been increasing and is projected to continue to grow. Due to dental prophylaxis, future generations of patients into more and more advanced ages will have more natural teeth than previous age cohorts.¹⁰ Transition from fixed to removable prosthesis will take place at a later age with potentially increased difficulties in adaptation.¹¹ Without adequate training and experience, young dentists will not be able to grasp the challenges presented by the physical, psychological, and social conditions of older patients and the concomitant complexities of dental treatment.¹²

The similarities of magnitude and direction of demographic change for countries in Europe has been well documented. However, formats¹³ and weighting of undergraduate dental teaching in gerodontology in different European countries are dissimilar¹⁴ and have not been sufficiently researched. Using Brazil as example of a country with a predominantly young population outside Europe, one study found that two-thirds of its dental schools did not offer the subject of gerodontology even though students had expressed an interest in interacting with older patients in practical teaching modules.¹⁵ For Canada, Ettinger recently described shortfalls in under- and postgraduate training in gerodontology due to curriculum time, funding, and training of faculty.¹⁶ In addition, limited financial resources have been hampering the development of gerodontology in developing countries.¹⁷

The study compares data of 2004 and 2009 on the undergraduate teaching of gerodontology at university dental schools in the German-speaking countries of Austria, Germany, and Switzerland. Its objective is to assess changes in content, quantity, format of teaching with an emphasis on extramural activities, and changes in resources allocated to gerodontology. This report also presents information on research activities and postgraduate teaching at the participating universities.

Material and Methods

Questionnaires with open and closed questions, developed and used for the study in 2004, were again sent to all university dental schools in Austria (A; n=3), Switzerland (CH; n=4), and Germany (D; n=30) in 2009 after a minor revision of two questions being added. One questionnaire of ten items was sent to the deans of the thirty-seven university dental schools. Another questionnaire of thirty-two items was mailed to 140 independent departments of those dental schools, excluding departments of orthodontics and pedodontics (A: n=11; CH: n=16; D: n=113).

The objective of the questionnaires was to collect information on content, frequency, and formats of teaching of gerodontology, the departments and faculty involved, and additional questions on continued education and research activities. Nonrespondents received a reminder letter. Descriptive statistical analysis was performed using SPSS V.16.0 (SPSS Inc., Chicago, IL).

Results

Detailed results of the 2004 survey have been previously published.¹⁴ Results of the 2009 survey are reported here, along with comparisons between the two.

Survey of Deans

Twenty of the total thirty-seven deans returned the questionnaires (overall 54.1 percent response rate). The return rate was 50 percent in Switzerland (n=2), 66.6 percent in Austria (n=2), and 53.3 percent in Germany (n=16). None of the Austrian universities, all of the Swiss universities, and five of the German universities (31.3 percent) have organizational units that teach gerodontology. In both universities in Switzerland, gerodontology was taught in the Prosthodontics Department, once in an independent division of the department. In Germany, gerodontology was mostly taught in the Departments of Prosthodontics and Materials Science (n=4). One university included gerodontology content in the three core subjects and in preclinical studies. All German universities that taught gerodontology also performed research in the field. In Austria, one university had a research department dedicated to gerodontology. One par-

ticipating Swiss independent institution reported research activities.

Nine of sixteen (56.3 percent) participating German deans reported they were seeking improvements in the teaching of gerodontology. Improvements mentioned were designing a new curriculum (n=2), introducing a dedicated lecture series with case presentations (n=1), and improving coordination between lecturers (n=2). Furthermore, one dean said that the introduction of gerodontology into the undergraduate course should be interdisciplinary in nature (n=1). Two of the deans proposed introducing gerodontology topics into the main lecture series of the core subjects. One dean reported that access to dental care for seniors at university teaching hospitals needed to be improved.

The interdisciplinary nature of gerodontology teaching was also highlighted by one Austrian dean. Another dean from Austria suggested that the presentation of gerodontology topics in Austrian public education should be significantly increased. Swiss deans expressed the need for improved staffing levels in gerodontology departments (n=1) and for the introduction of a professorate of gerodontology (n=1).

Department Heads Survey

Of the 140 questionnaires sent to the heads of the departments, eighty-eight (62.9 percent) were returned (A: n=8, 72.7 percent; CH: n=7, 43.8 percent; D: n=72, 63.7 percent) and included in the analysis. Each university in Austria, Switzerland, and Germany returned at least one questionnaire.

In all countries, the return rate by core subject was highest from their departments of prosthodontics (A=100 percent; CH=71.4 percent, D=81.6 percent) (Figure 1).

Lecture series on traditional core subjects.

To facilitate the analysis and comparison of the data, the large number (A=64, CH=145, D=248) of topics taught as listed by respondents were assigned to the same eleven domains developed for the survey in 2004 (Table 1).¹⁴ The wide variety of ninety-three topics highlights the multidisciplinary nature of gerodontology.

Aspects of gerodontology were reported as presented mainly in the core subject of prosthodontics as stated by seven Austrian (n=8; 87.5 percent), five Swiss (n=7; 71.4 percent), and sixty German (n=72; 83.4 percent) departments. The total number of departments teaching gerodontology within core subjects by country was 148 (A: n=14; CH: n=13, D: n=121). Departments were assigned to four groups according to the self-declared number of hours of gerodontology taught. The proportion of the number of departments in each group by country is shown in Figure 2. When we compared lecture time of the three countries, Swiss universities taught the most lectures (of forty-five minutes' duration) in gerodontology. The most prominent topics were geriatric/gerontologic in nature (Figure 3).

Dedicated lecture series, seminars, and extramural activities. A lecture series dedicated to gerodontology was included in two out of three Austrian, all Swiss, and seven of the thirty German curricula. This series was generally offered within

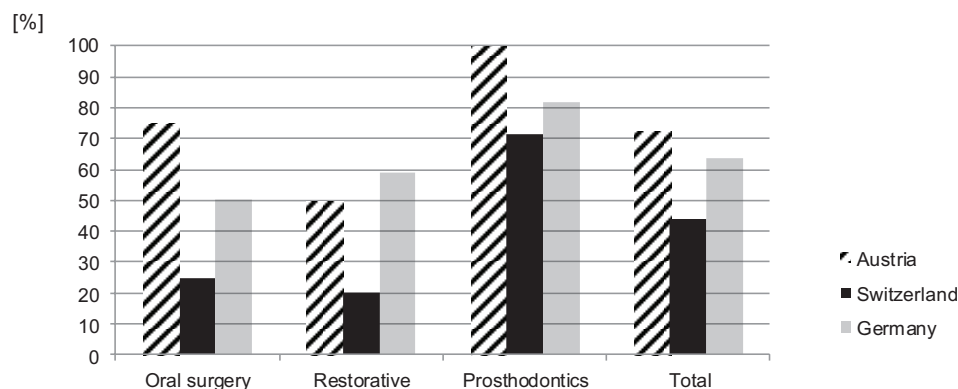


Figure 1. Response rate from departments (n=140) by country and by core subject of prosthodontics, restorative dentistry, and oral surgery

Table 1. Assignment of topics taught in gerodontology to eleven domains

Domain	Topics Taught	Domain	Topics Taught
1. Surgery	oral surgery/oral medicine physiology and pathophysiology of aging medical findings, risk factors, and medication soft tissue diseases oral neoplastic diseases traumatology pre-prosthetic surgery/augmentation burning mouth syndrome wound healing and disturbances local anesthesia dental extractions	9. Geriatric dentistry (cont.)	difficulties in the treatment of elderly patients mobile dentistry oral health of elderly patients oral-geriatric rehabilitation access to dental care at home and in nursing homes interdisciplinary assessment correlation between oral health and systemic diseases integration of gerodontology into general dental practice methods of treatment/therapeutic concepts chances and limitations of prevention in old age
2. Prosthodontics	gerontoprosthodontics types of dental prosthesis TMD diagnostics and treatment denture adaptation/intolerance chewing force, chewing efficiency, and function planning criteria for dental prosthesis prosthetic follow-up epithesis forensic planning approaches caring for dental prosthesis dental prosthesis and soft tissue alterations difficulties during treatment of older patients	10. Geriatrics/gerontology	typical diseases in old age theories of aging pharmacology and multiple drug use geriatrics and ethics dealing with impairments and discrimination of elderly patients quality of life in old age coping strategies demographic shift psychology and behavior in old age legal aspects of treatment provision for patients with mental-cognitive impairments dementia, depression, delirium geriatric assessment dehydration psychological alterations in old age cooperation with nursing staff geriatric syndromes aging in good health/prevention social aspects of public health cognitive and motor impairments multimorbidity frailty neuropathology life in nursing care facilities acceptance and coping strategies of psychologic alterations age-based adequate health care cooperation with primary care physicians palliative care burnout in nursing staff, doctors, relatives options for provision of nursing care in case of need
3. Conservative dentistry	cariology, etiology, treatment, and prevention forms of caries in elderly patients esthetic dentistry erosion, abrasion, attrition age-related alterations dental fillings	11. Physiology of aging	alterations in saliva and salivary glands physiological changes in old age physiological changes and patho-physiological alterations in aging oral mucosa physiological changes and patho-physiological alterations in aging skin
4. Periodontology	periodontitis in old age and its treatment periodontal immunologic response halitosis microbiology recessions		
5. Endodontics	endodontics in old age		
6. Implantology	oral implantology in old age		
7. Oral hygiene/prevention	oral hygiene in old and very old patients prevention of caries age-dependent prevention		
8. Nutrition	nutrition in old age malnutrition		
9. Geriatric dentistry/general gerodontology	treatment planning: emergency, stabilization, definitive treatment, prophylaxis plan communication patient guidance patient-dentist interaction treatment for patients with differing degrees of frailty demographic shift and perspectives of dentistry therapeutic concepts in old age dental consultancy service for nursing homes		

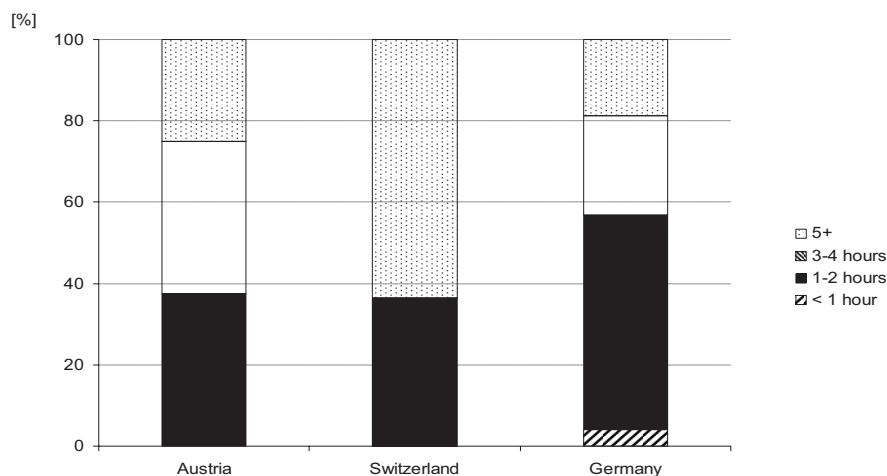


Figure 2. Proportion of total number of departments (A: n=14; CH: n=13, D: n=121) by country teaching gerodontology within core subjects, following assignment to four groups according to number of hours lectured

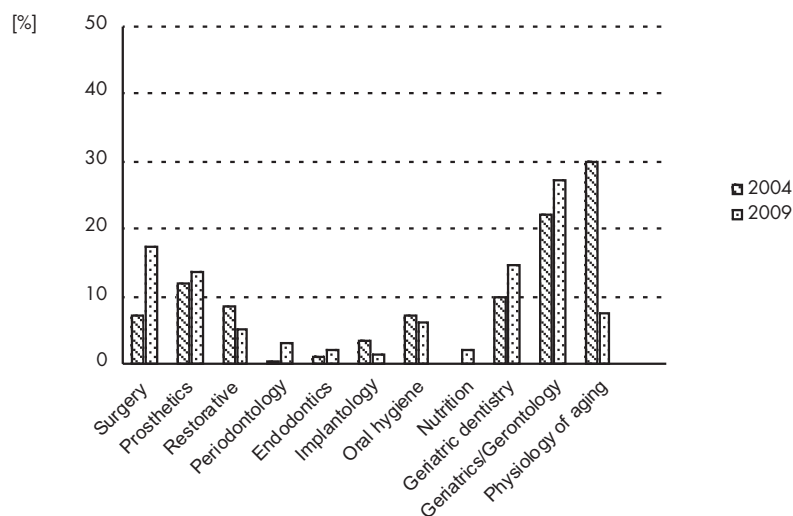


Figure 3. Distribution of gerodontology topics taught in traditional core subjects (2004 n=351, 2009 n=401) after assignment to eleven domains

one semester, in most cases in the third or final study year. Number of lecturers involved was on average six (range one to eleven) in Germany, four in Austria (range one to ten), and eight in Switzerland (range two to eleven).

The content offered in the dedicated lecture series also reflected the multidisciplinary nature of gerodontology (Figure 4). Compared with the traditional core subjects, the geriatric/gerontology content

(36.2 percent) was even higher. Nutrition received more attention in the dedicated lecture series than in the core subjects.

All Swiss and two of the three Austrian universities offered gerodontology seminars. In Germany, only six of thirty participating dental schools included gerodontology seminars. Practical exposure to mobile dentistry and extramural activities in nursing homes were available to three-quarters of Swiss but

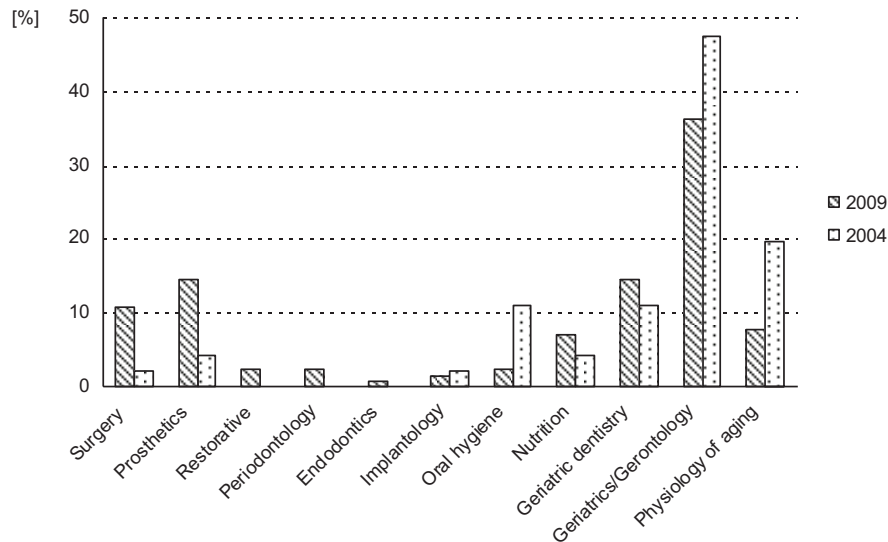


Figure 4. Distribution of gerodontology topics taught in dedicated lecture series (2004 n=77, 2009 n=130) after assignment to eleven domains

to only one-third of Austrian and German students. Participation in practical teaching in nursing homes was mandatory in seven of nine German and in all three Swiss but in none of the Austrian universities in 2009.

Comparison of 2004 and 2009 Results

Lecture series of traditional core subjects.

Within the lecture series on traditional core subjects, there was an increase in the presentation of gerodontology topics across almost all domains. This increase was most noticeable in the domains of surgery, periodontology, geriatric dentistry, and geriatrics/gerontology. Exceptions to this general increase were physiology of aging and, to a lesser extent, restorative dentistry, implantology, and oral hygiene (Figure 3). Comparing the gerodontology content of the three core subjects, it can be seen that, in both 2004 and 2009, dental prosthetics included more gerodontology than did restorative dentistry and oral surgery.

Dedicated teaching activities. The quantity of dedicated gerodontology teaching in Germany and Austria has increased during the observation period between 2004 and 2009. The proportion of universities in Germany offering dedicated lecture

series and/or extramural activities increased from 29 percent to 40 percent. In Austria, none of the three universities offered dedicated gerodontology teaching in 2004, while in 2009 one university reported a lecture series and one a combination of lecture and practical teaching. The high level of dedicated teaching activities previously reported from Switzerland remained unchanged (one university with a lecture series only, three universities with a combination of lecture series and practical extramural teaching activities) (Table 2).

The scope of topics taught in dedicated lectures has broadened as evidenced by the fact that periodontology, endodontics, and restorative dentistry had been newly added in 2009. Surgery and prosthetics topics have increased in numbers, while a decrease in geriatrics/gerontology, physiology of aging, and oral hygiene teaching was reported.

Continuing professional education and research. The proportion of departments offering gerodontology lectures for continuing professional development of their faculty had decreased to 41.4 percent in 2009 (2004: 50.5 percent). However, the proportion of departments with dedicated staff for gerodontology had increased to 34.5 percent (2004: 26.7 percent). Research activities had slightly increased (2004: 31.7, 2009: 35.6 percent), and the mean number of publications had risen from 3.3 to

Table 2. Comparison of dedicated gerodontology teaching activities in 2004 and 2009

Teaching Activity	Austria				Switzerland				Germany			
	2004		2009		2004		2009		2004		2009	
	n	%	n	%	n	%	n	%	n	%	n	%
Lecture series only	0	0	1	33.3%	1	25.0%	1	25.0%	3	9.7%	3	10.0%
Practical extramural only	0	0	0	0	0	0	0	0	3	9.7%	5	16.7%
Combination of the two	0	0	1	33.3%	3	75.0%	3	75.0%	3	9.7%	4	13.3%
Total	0	0	2	66.6%	4	100%	4	100%	9	29.1%	12	40.0%

4.6 per department. Noteworthy is the respondents' much increased awareness of the German Society for Gerodontology: it was known to only 61.4 percent of participants in 2004, while 86.2 percent reported knowing about this professional body in 2009.

Discussion

The response rates of 54 percent and 63 percent (2004: 76 percent and 75 percent) respectively for the questionnaires sent to deans and department heads are acceptable for surveys of this nature. Every university returned at least one questionnaire, allowing the results to be interpreted as being representative of the German-speaking countries. However, a selection bias cannot be excluded as indicated by the higher response rates from departments of prosthodontics, where, in most dental schools, teaching of gerodontology traditionally began. Data analysis has to allow for the possibility that respondents who had a particular interest in the subject may have been more inclined to return questionnaires than those who did not. The lower response rate in 2009 may be the result of an increased administrative burden of respondents leading to fatigue. The open format of the questionnaire was designed to encourage a broad range of responses covering topics from all dental specialties. Assigning topics to specific subjects and domains entailed loss of some detail but facilitated analysis of the data.

The need for gerodontology education in Europe has been established in previous studies,^{4,13} and the current survey found that all universities generally shared an interest in integrating gerodontology into their undergraduate curricula though differences remain. Interestingly, in 2004, the deans of universities in Austria, where there are no departments of gerodontology, did not make any suggestions about how to improve the teaching of gerodontology.¹⁴

However, in the 2009 survey, one Austrian dental school offered a lecture series, and another university introduced a combination of a dedicated lecture series and an extramural activity. The 2004 survey found that the teaching of didactic and practical aspects of gerodontology had been firmly established in all dental schools in Switzerland.¹⁴ This situation was confirmed by the 2009 survey. Even though dedicated gerodontology teaching in Germany had also increased during the observation period, 60 percent of German dental schools in 2009 still did not offer any dedicated lecture series or practical courses in gerodontology. This may be related to the lack of compulsory gerodontology content in the German dental curriculum established by the federal government back in 1955. This curriculum was last revised in 1986 and is currently awaiting another major review. Gerodontology has been established as a mandatory subject in Switzerland, and all Swiss students in their national final examinations have to answer the same questions on gerodontology. This is not the case in Germany or Austria where the subject is not included in final examinations. This may be a barrier to the teaching of gerodontology as assessment has a significant influence on learning and students' motivation.¹⁸ One may optimistically envision that the review process of the education system in Germany will eventually lead to inclusion of gerodontology assessment in its national final examinations.

According to the findings of this study, those universities that offered dedicated lecture series in gerodontology focused on subjects of geriatric medicine and dentistry plus a broad range of well-balanced additional subjects not previously taught. These subjects transcend the boundaries of traditional teaching in the core disciplines. They contain supplementary aspects of dental diagnosis, treatment planning, and clinical approaches and should therefore not be seen as competing with the teaching of traditional subjects but rather as complementing them. It could be argued

that gerodontology could strengthen the standing of dentistry within medicine as a whole.

Aspects contributing to student competence in gerodontology are knowledge, skills, and attitudes.¹⁹ Our study covered educational content primarily designed by dental schools in German-speaking countries that impact on the first two factors. Based on a solid foundation of theoretical knowledge, students have to acquire practical skills in providing dental care to older patients.²⁰ This ideal situation has been achieved in the majority of universities only in Switzerland, whereas in Germany there appears to be room for improvement. The experience of students participating in the mobile dental clinic (mobiDent) in Zürich has shown that practical training with the opportunity to provide dental treatment to patients is well accepted by students. In contrast, students in Leipzig, Germany, who were limited to performing diagnostic procedures and treatment planning expressed some frustrations at not being able to provide actual treatment.^{9,21} Increased didactic gerodontology and experiential content of the undergraduate course alone are insufficient to improve the oral health of seniors. The behavior of students and, subsequently, of qualified dentists is influenced by a host of factors many of which, like the economic and working environment in dental practice, lie well beyond the influence of the dental school. However, attitudes, functioning as an important determinant of behavior, may be influenced by educational experience. Within the limitations of this study, this aspect could not be explored. Results of a study on the attitudes of participants in a gerodontology extramural program are being prepared for publication.

Oral health benefits for seniors as the final outcome of all undergraduate and postgraduate measures should ideally be researched longitudinally. Studies of this nature would require resources well in excess of those currently available. About one-third of departments in our study reported having gerodontology dedicated staff and performing gerodontology research. Considering the possibility of a reporting bias, the true figure may well be lower. Establishing independent gerodontology departments with their own budgets might be the ideal approach to increase research capacity but could be difficult to implement in times of general financial constraints.

Assessing the impact of the various educational methodologies described by participating faculty members for their students was beyond the scope of this study. Dental schools that offer increased instruction in gerodontology and focus on positive

experiences with older dental patients can be assumed to be preparing students to graduate with increased awareness of the particular oral health needs of seniors.²² There are no publications linking the educational experience of dental students directly to oral health benefits of this group of patients, although such outcomes have been documented for frail elderly who have improved access to dental care through mobile dental services.²³ It would be useful to establish whether qualified dental practitioners, after repeated educational exposure to gerodontology content during their undergraduate studies, would be more inclined to tailor their practices proactively to the needs of older patients when the economic environment and other external factors are conducive.²⁴ There are indications that the current under- and postgraduate training situation has not led to improved oral health of residents in long-term care facilities.^{8,25} Barriers preventing practitioners from offering services to seniors have to be identified and addressed.

To further establish the subject of gerodontology at dental schools, continuing professional education of faculty in all departments, an intensified cooperation between departments, and the presence of some faculty specializing in gerodontology have been recommended.^{16,26} These suggestions are in line with the current guidelines of the European College of Gerodontology (ECG) published in 2009,⁴ which highlight the necessity of adequately preparing students for the provision of dental treatment to senior patients. Theoretical knowledge, practical skills, knowledge of the ethical foundation, and, ultimately, specially directed patient management and guidance are listed as relevant content for dental curricula. In the absence of specialist departments of gerodontology, the undergraduate course should at least be accompanied by faculty specialized in gerodontology. The ECG guidelines recommend that gerodontology content should be included in all traditional subjects, which, according to the data presented in our study, has been widely followed. In addition, specially structured lecture series on gerodontology should be established that highlight the interdisciplinary nature of the subject. This essential measure as well as practical training in the care of senior dental patients at extramural locations has yet to be implemented in many dental schools. Integration of gerodontology into the undergraduate dental syllabus is a demand that has found support recently from the Council of European Dentists as stated in their declaration of November 19, 2010.^{27,28}

Limited financial resources were listed by deans in our study as a barrier to the further devel-

opment of gerodontology in German, Swiss, and Austrian dental schools. This barrier could be overcome by intensifying communication cooperation and collaboration among university dental schools. The Bologna Declaration²⁹ and the guidelines of the Association for Dental Education in Europe³⁰ encourage the development of such exchanges of faculty and students.

Increasing demand for postgraduate courses in gerodontology by dental practitioners has led to a number of such courses being offered in Great Britain, the United States, and Scandinavia.³¹ In Germany, postgraduate curricula are on offer, often organized by the specialist association of gerodontology in cooperation with regional chambers of dentists and university lecturers. The courses focus on patient- and population-centered treatment, specific knowledge, and health science, general medical, and epidemiologic aspects of clinical care.

Based on the findings of our survey, the substantial interest in gerodontology found in 2004 has led to increases in both didactic and practical training in Austria and Germany. Barriers to further development of the subject exist and need to be addressed. Since data were collected in 2009, further developments may have occurred in the areas addressed in this study and should be taken into account in future research.

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